

**INTERCONNECT STRUCTURES INCORPORATING LOW-k  
DIELECTRIC BARRIER FILMS**

**ABSTRACT OF THE DISCLOSURE**

[0052] The present invention comprises an interconnect structure including a metal, interlayer dielectric and a ceramic diffusion barrier formed therebetween, where the ceramic diffusion barrier has a composition  $\text{Si}_v\text{N}_w\text{C}_x\text{O}_y\text{H}_z$ , where  $0.1 \leq v \leq 0.9$ ,  $0 \leq w \leq 0.5$ ,  $0.01 \leq x \leq 0.9$ ,  $0 \leq y \leq 0.7$ ,  $0.01 \leq z \leq 0.8$  for  $v + w + x + y + z = 1$ . The ceramic diffusion barrier acts as a diffusion barrier to metals, i.e., copper. The present invention also comprises a method for forming the inventive ceramic diffusion barrier including the steps depositing a polymeric preceramic having a composition  $\text{Si}_v\text{N}_w\text{C}_x\text{O}_y\text{H}_z$ , where  $0.1 < v < 0.8$ ,  $0 < w < 0.8$ ,  $0.05 < x < 0.8$ ,  $0 < y < 0.3$ ,  $0.05 < z < 0.8$  for  $v + w + x + y + z = 1$  and then converting the polymeric preceramic layer into a ceramic diffusion barrier by thermal methods.